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The Rationale for Case-Mix and Mode Adjustments to AHRQ's CAHPS Surveys

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Outline

- Background
- Purpose and Methods of Case-Mix and Mode Adjustment
- Examples of Case-Mix and Mode Adjustments
- How Adjustments Typically Affect Scores
- Misunderstandings about Adjusting Data

CAHPS Surveys: Overview

- CAHPS surveys provide comparative information about the patient experience dimension of health care quality
 - ▶ Sometimes components of pay-for-performance programs by CMS or others
- Survey responses can be influenced by factors that do not reflect the quality of care received:
 - ▶ **Response tendencies of the people who complete them (case-mix effects)**
 - ▶ **Influence of survey protocols on who responds or how they respond (mode effects)**
- Without appropriate adjustment, differences in these factors across reporting units (plans, hospitals, hospices, medical groups, providers, etc.) could jeopardize the comparability of patient experience survey results

What Is Case-Mix Adjustment (CMA) and Why is it Done? (1 of 2)

- CMA , sometimes called patient-mix adjustment (PMA), adjusts patient experience scores to control for **respondent characteristics that affect responses independent of care provided**
- CMA aims to remove the effects of patient characteristics not under provider control to promote fairer comparisons
 - ▶ E.g., More educated and younger respondents provide less positive responses for the same care than less educated, older respondents
 - ▶ CMA also **reduces incentives to avoid enrollees or patients** more likely to provide lower scores for comparable care

What Is Case-Mix Adjustment (CMA) and Why is it Done? (2 of 2)

- CMA uses statistical models to predict what each health plan's, hospital's, or provider's ratings would have been for a standard patient or population (typically the population average patient), removing the predictable effects of patient characteristics not under the control of the health care provider
- CMA seeks to accurately measure the quality of care provided (in this case the patient experience dimension)
 - ▶ **Hospitals and plans with underserved patient populations may score lower than those serving affluent patients even after good CMA**-this is not a failure of CMA but rather reveals health disparities that unfortunately affect both patient experience and clinical aspects of quality
 - ▶ Additional efforts are needed to address costs of care and incentivize health equity, such as stratified reporting, health-equity-targeted incentive payments and other aspects of payment policy

What Is Mode Adjustment and Why Is It Done?

- In some settings, **different reporting units choose among several survey mode protocols** for all of their patients
 - ▶ For example, in CMS implementations, this is true for Hospital CAHPS (HCAHPS) and Hospice CAHPS, but not Medicare Advantage CAHPS
- Survey mode protocol can affect responses in 2 ways:
 - ▶ Who responds
 - E. g., Older respondents more likely to respond by mail; younger people more likely to respond by phone
 - ▶ How they respond
 - e.g., Phone respondents more likely than mail respondents to select the last option read aloud (“never, sometimes, usually, **always**”)
- Without appropriate adjustment, healthcare entities providing similar care but using different survey mode protocols can have substantially different scores
 - ▶ Ideally mode adjustment (when needed) and CMA are used in combination

Variables that Are Used to Adjust for Case Mix

- Appropriate case-mix adjusters are patient-level variables that are not under the control of the provider (“exogenous”) but result in different scores even when the quality of care is the same
 - ▶ E.g., patient education and age are not under the control of the provider
 - ▶ Providers can and should adapt and customize to any patient characteristics- that is patient-centered care- but CMA limited to things that providers cannot change
 - You can customize care for older patients, but you cannot make older patients younger

Variables that Are Not Used for Case-Mix Adjustment

- **Do not adjust** for variables under a provider's control (“endogenous”) -**things that reflect a delivery model or may be a consequence of care**
 - ▶ E.g., patient experience is better with greater staffing, but HCAHPS does not adjust for staffing levels because HCAHPS is designed to describe how good the experience is
 - ▶ Length of stay and length of relationship are other endogenous variables
- **Do not adjust for reporting-unit-level (“provider-level”) characteristics**
 - ▶ Must vary at the patient level within-provider to separate CMA effect from provider quality
 - ▶ Adjusting for provider-level factors makes the false assumption that true quality does not vary by geographic location, profit status, etc.
 - Need to find a patient-level measure of the hypothesized concept instead

Why Case Mix Adjusters Vary Across Settings

- Some adjusters are important across all settings
 - ▶ Age, education, language
- Other adjusters are setting specific
 - ▶ E.g., service line important for a hospitalization, primary diagnosis important for hospice care, but both less important in a health plan survey, where all aspects of care over 6 months are being evaluated
 - ▶ Some surveys like Hospice CAHPS or Child HCAHPS must consider both respondent and patient characteristics
 - Respondent characteristics are often at least as important as patient characteristics

Case-Mix Adjustment Methodology

- The most common CMA method is a linear regression predicting patient-level from provider intercepts and case-mix variables in observational implementation data
 - ▶ The case-mix effect is the **mean within-unit difference** uniquely associated with the adjustor
 - ▶ The case-mix adjustments are -1 times the effect, to neutralize its effect on scores
- Person-level coefficients and national means of CMA variables are typically reported
 - ▶ Reporting-unit-level adjustments are a sum of a series of products
 - ▶ Being above average on a characteristic associated with less positive responses (e.g. age 18-24 vs. age 65-69) results in a positive adjustment for that variable, and vice versa
 - ▶ Being above average on a characteristic associated with more positive responses (e.g., maternity service line) results in a negative adjustment for that variable

Examples of 2024 CMA Variables

HCAHPS	MA CAHPS	Hospice
Age	Age	Decedent and respondent age
Education	Education	Respondent education
General health	General health	Primary diagnosis
Mental health	Mental health	Payer for hospice care
Language spoken at home	Asian language survey	Language (survey+decedent)
Service line x sex	Medicaid dual	Relationship of caregiver to decedent
Service line x age	Low income subsidy	Length of final episode of hospice care
Response percentile	Proxy assistance	Response percentile

Introducing “Planned Stay” as a new HCAHPS Case-Mix Adjuster

- In the 2021 HCAHPS Mode Experiment, patients were asked “Was this hospital stay planned in advance?”
 - ▶ 61% of patients reported “No,” 10% “Yes, somewhat,” and 29% reported “Yes, definitely”
 - ▶ “Yes, somewhat” respondents were similar to “No” respondents
 - ▶ **Surgical and maternity service line** patients and those in **better health** were most likely to report that a stay was definitely planned
 - ▶ Cognitive testing established that patients understood this item as intended
- Planned Stay scoring:
 - ▶ “Yes, definitely”=1
 - ▶ “Yes, somewhat” and “No”=0

CMS Anticipates Adding New HCAHPS Adjuster for Unplanned Stays with 2025 Discharges

- In the 2021 mode experiment, Planned Stay was positively associated with HCAHPS measures
 - ▶ Adjustments for planned stays relative to unplanned stays would be negative
- Planned stay made a unique contribution beyond those from other current HCAHPS patient-mix adjusters
 - ▶ The magnitude of the Planned Stay adjustment is moderate relative to other PMA variables
- New planned stay adjustment goes into effect beginning with 2025 discharges pending rulemaking for updated HCAHPS survey

Planned Stay Adjustment Patterns for Planned Stay: Example

- In mode experiment data, the national average for planned stay (Yes, definitely) was 0.29 (29%) and its top-box adjustment for Nurse Communication is -5.4
- Imagine Hospital A and Hospital B both have a 64 on Nurse Communication after adjustment for mode and all other CMAs, but they have 49% and 9% planned stays, respectively
 - ▶ Final score for Hospital A is $64 + 5.4 * (0.29 - 0.49) = 64 - 1.08 = 63$
 - ▶ Final score for Hospital B is $64 + 5.4 * (0.29 - 0.09) = 64 + 1.08 = 65$

Common Effects of Survey Mode on Responses

- Social desirability effects
 - ▶ Endorse socially desirable options more often when directly “observed”
 - ▶ Effects largest in person, then phone, smaller for written, Web, IVR
 - ▶ Reporting better care might be socially desirable
 - ▶ **Predicts effects throughout the scale**
- Recency effects
 - ▶ Endorse last response options more often in auditory (phone, IVR) than visual (mail, Web) presentation
 - ▶ **Predicts effects mainly on the last response option**
 - ▶ In HCAHPS and most CAHPS implementations, the last option is most positive, thus auditory presentations tend to have positive effects when several response options read aloud (often less of an effect for 0-10 or Yes/No)
- Recency effects may be the most important explanation for CAHPS mode effects
 - ▶ Effects strongest on last item
 - ▶ Reversing answer options can flip mode effects

Survey Mode Adjustments

- Cannot derive survey protocol adjustments from regression models using observation data because the choice of survey mode protocol and the performance of the reporting unit are confounded
 - ▶ E.g., What if higher-performing, better-resourced hospitals more often use Phone-Only?
- Survey mode adjustments require randomized mode experiments in which patients within the same reporting unit are randomly assigned to survey mode protocols
 - ▶ Predict patient-level response from survey mode protocols, CMA variables, and reporting unit intercepts
 - ▶ In multimode protocols (e.g., web-phone or mail-phone), the adjustments are based on the mode protocol (e.g. Web-Mail) not on the mode of response (e.g., Web response)
- Not needed when all reporting units use the same protocol
 - ▶ E.g. MA-PDP CAHPS

Effect of the Survey Mode Adjustments, (HCAHPS Example)

- After mode adjustment, all hospitals' scores are equivalent to what would have been obtained in Mail-Only mode (the reference mode), making hospital scores comparable across all 6 modes that will be allowed starting with 2025 discharges;
 - ▶ The **choice of survey mode** can affect response rates and representativeness, but **does not change the expected adjusted score**
 - ▶ Unadjusted scores inappropriately reflect the contributions of mode and case-mix and are not valid for comparison

Example: 2025 HCAHPS Survey Mode Protocol Adjustments: Methods (1 of 2)

- Patients in Web-first survey mode protocols are classified by valid email address availability (EMA=email address available; NEMA=No email address available)
- NEMA patients in a Web-first protocol (e.g., Web-Phone) experience a delayed traditional survey mode protocol (e.g., delayed Phone-Only)
- Mode of response (e.g., Web vs. Phone within Web-Phone) does not affect adjustments
- The 6 adjustment cells incorporate EMA/NEMA and reflect the modes to which a patient was exposed:
 - ▶ **Mail-Only/Web-Mail (WM) NEMA (reference)**
 - ▶ Phone-Only/Web-Phone (WP) NEMA
 - ▶ Mail-Phone (MP, formerly known as “Mixed Mode”)/Web-Mail-Phone (WMP) NEMA
 - ▶ Web-Mail (WM) EMA
 - ▶ Web-Phone (WP) EMA
 - ▶ Web-Mail-Phone (WMP) EMA

Example: 2025 HCAHPS Survey Mode Protocol Adjustments: Methods (2 of 2)

- Regression models predicted each HCAHPS measure from 5 indicators (Phone-Only/WP NEMA, Mail-Phone/WMP NEMA, Web-Mail EMA, Web-Phone EMA, Web-Mail-Phone EMA) relative to the reference group (Mail-Only/WM NEMA)
 - ▶ Models included HCAHPS patient-mix adjusters and hospital fixed effects
 - ▶ Mode adjustments are the survey protocol coefficients from those models multiplied by -1
- Survey mode protocol adjustments differ by EMA/NEMA for Web-first protocols

New HCAHPS Top-Box Survey Mode Protocol Adjustments for Proposed Updated HCAHPS Summary (Mail Only/WM NEMA reference)



Measure	PhoneOnly/ WP NEMA	MP/ WMP NEMA	WM EMA	WP EMA	WMP EMA
Nurse	-5.4%	-1.0%	-1.5%	-2.2%	-2.2%
Doctor	-2.5%	-0.8%	-1.8%	-1.1%	-1.2%
Staff Responsiveness	-2.6%	2.7%	1.0%	0.3%	0.4%
Rx Communication	-6.1%	-1.9%	-2.2%	-3.1%	-5.0%
Clean	-0.9%	-0.7%	1.1%	2.6%	-1.0%
Quiet	-7.1%	-0.9%	1.4%	-3.3%	-1.0%
Discharge Information Rating	-1.3%	0.4%	0.3%	-0.5%	-0.4%
Recommend	-0.7%	0.2%	0.2%	1.7%	2.6%
Care Coordination	-3.2%	0.9%	-0.3%	1.1%	0.5%
Restfulness of Hospital Environment	-4.8%	0.0%	-0.1%	0.2%	-0.1%
Information about Symptoms	-7.2%	-1.6%	2.3%	-1.1%	1.6%
Average	-4.6%	0.1%	-1.5%	0.0%	-1.3%
	-3.9%	-0.2%	-0.1%	-0.5%	-0.6%

Selecting a Survey Mode: HCAHPS Example (1 of 2)

- A hospital's survey mode should be selected to maximize its RR and representation of its patient population
- Multimode protocols (MP, WM, WP, WMP) outperform single mode protocols (Mail-Only, Phone-Only)
 - ▶ For young and diverse patient populations, multimode protocols that include phone achieve the best RRs
 - ▶ For older, predominantly White patient populations, multimode protocols that include mail achieve the best RRs
- The full RR benefit of Web-first protocols (WM, WP, WMP) comes at high levels of EMA

Selecting a Survey Mode: HCAHPS Example (2 of 2)

- Hospitals should not select a survey mode protocol based on survey mode protocol adjustments
 - ▶ Survey mode protocol adjustment “levels the playing field” across all survey mode protocols
 - ▶ Full adjustment accounts for survey mode protocol and patient mix
 - ▶ The choice of survey mode protocol does not change the expected final fully adjusted HCAHPS score
 - ▶ EMA level also does not affect the expected fully-adjusted HCAHPS score
- Web-first protocols may not yield much RR or cost benefit at very low levels of EMA

Case Mix and Mode Adjustments are Not Penalties When Scores Go Down

- Case-mix adjustment and mode adjustments **counteract things that have already affected raw scores** due to factors outside of the provider's control
 - ▶ Adjustment results in more comparable scores across reporting entities than raw scores
 - ▶ E.g., if a hospital switches from Mail-Only to Phone-Only, we expect its raw scores to go up but its adjusted scores to stay the same
- None of the adjustments are value judgements; they are just derived from the data about how otherwise similar people respond in the same hospitals

The Effect of Adjustments

- Mode adjustments can be substantial because they happen at the reporting unit level, even if they are not large at the patient level
- Case-mix (or patient-mix) adjustment is typically smaller than mode adjustments
 - ▶ Case-mix adjustment is typically also small for most reporting units but occasionally large for some reporting with very atypical patients
- For case-mix adjustment, the most common pattern is to have a few large upward adjustments with downward adjustments relatively small on average

Summary

- Careful case-mix adjustment for patient-level factors that a patient brings to the health care setting can improve the validity and comparability of patient experience data and can reduce incentives to avoid some patients
- When different reporting units use different survey modes, mode adjustments are needed to make their scores comparable, so that the best, most representative survey modes can be selected with no effects on expected adjusted score
- Reliable and valid patient experience scores are important inputs to quality improvement and health equity efforts
 - ▶ When they reveal disparities or shortcomings, tools such as stratified reporting, payment policy, and equity-focused incentives can help close the gap